should have been told that the only thing to do was to prohibit entirely uninsulated wires of any kind from crossing below the telegraph wires. Why should the telegraph wire be banished underground rather than the overhead equipment changed to the conduit system which Mr. Rider has shown us can be so efficient? We fancy the objection which would be made to the change by either party would be the same—that they would prefer the other side to make it and to pay for it.

The ancient recipe for cooking a hare applies with particular force to the design of a system of electric tramways; the motto of the tramway engineer should always be "First catch your passenger." One cannot read this, or, indeed, any comprehensive book on electric traction, without being strongly impressed by the degree to which the whole of the engineering depends ultimately on the halfpenny passenger. The engineer builds a bridge, dams a river or constructs a railway from the Cape to Cairo, and the work is a piece of engineering almost pure and simple, but he may design and equip a first class traction system—generating station, engines, dynamos, cables, track, line and cars—and if he is out of his reckoning as to the time the housewife goes to market all his energy has been wasted. It is she who determines the kind of car and the kind of service, and, these once settled, everything else follows almost as a matter of course. It is here really that electric tramways and electric traction score so heavily; they have the flexibility which enables them to be designed to meet and to satisfy the requirements of the public in a way which cannot be done by the omnibus on the one hand or by the steam railway on the other. The fact that electric traction came into being when these other means of transport were in strong possession of the field has been to its own advantage; it has had to cater for the requirements of the public in a way to attract them from its rivals, and the success with which it has done so is shown by the reaction on the railways, which are one by one resorting to electrification as their only salvation.

Electric tramway and railway development in England has been for a long time retarded from various causes, but of late years it has been making steady progress. Though much has already been done, there is still a vast amount to do. Our large cities all afford transit problems which it is safe to say no other method of traction yet known can solve so satisfactorily, and when these, as socially the more pressing, have been tackled, the question of light railway construction between town and town still offers great fields for development. We have not here the opportunities which the Americans possess but we have problems of our own at once more difficult and more urgent of solution. London in particular is a case in point, and there can be no doubt that once the Royal Commission now sitting has reported electric traction schemes for London will be plentiful. The electrical engineer who decides to go in for traction work is certain before long of great opportunities; he cannot better prepare himself for taking advantage of those opportunities than by reading Mr. Rider's book.

Maurice Solomon.

OUR BOOKSHELF.

Milk, its Production and Uses. With Chapters on Dairy Farming, the Diseases of Cattle, and on the Hygiene and Control of Supplies. By Edward F. Willoughby, M.D. (Lond.), D.P.H. (Lond. and Camb.). Pp. xii+259. (London: Charles Griffin and Co., Ltd., 1903.) Price 6*s*. net.

All medical men and hygienists must necessarily know something about milk and its production, and this work, in a comparatively small compass, deals very fully and adequately with the whole subject. The author, being scientific adviser to one of the largest of the London dairy companies, has had practical experience in all branches of the subject, and his views, therefore, are worthy of confidence. The first four chapters are devoted to a consideration of the various breeds of cows, the qualities of the milk they produce, and their housing, feeding, breeding, and diseases.

In the fifth chapter the legal aspects of diseases of cattle are discussed, and a useful summary of the "Diseases of Animals Acts" and of the "Dairies, Cowsheds and Milk Shops Orders" is given.

The important subjects of the elimination of tubercle and the inspection and control of cowsheds are briefly treated. The physiology and dietetics of milk, pasteurisation and sterilisation, condensed, skimmed, and separated milks, therapeutics of milk, koumiss and other milk preparations, and diseases conveyed by milk, all receive brief attention.

The book concludes with chapters on the dairy, on milk analysis, on control of adulteration, with an abstract of the Foods and Drugs Act, and on the bacteriological examination of milk. The whole work is eminently practical and readable. As regards the conveyance of scarlatina by milk, the well known Hendon outbreak is detailed, but no reference is made to Prof. Crookshank's researches, which throw considerable doubt on some of the conclusions arrived at by the officials of the Local Government Board. The author considers that the alleged tendency to scurvy or scurvy rickets in infants brought up on sterilised milk is not proven, and with this we agree. It is stated (p. 142) that Nuttall and Thierfelder failed to rear young rabbits and fowls brought into the world under aseptic conditions so that their intestinal tracts were free from bacteria. This is not the case; Nuttall and Thierfelder found that guinea-pigs (not rabbits) so reared were even more vigorous than animals reared under ordinary conditions.

The book will prove a useful work of reference, especially for medical officers of health, and the numerous excellent illustrations add considerably to its value.

R. T. Hewlett.

A Treatise on the Principles and Practice of Dock Engineering. By Brysson Cunningham, Assoc.M.Inst.C.E. Pp. xviii + 559. (London: Charles Griffin and Co., Ltd., 1904.) Price 30*s*. net.

The author of this book is on the engineering staff of the Mersey Docks and Harbour Board, which has control over the largest and most efficient system of docks in the world. During the last few years, under the direction of Mr. Lyster, the engineer-in-chief, these docks have been modernised and brought up to date. New deep-water basins and repairing docks have been built; the entrances and sills of some of the old docks have been lowered. Transit sheds and cranes of modern type have been erected, so that these docks are now able to deal with the largest class of vessels yet built, and to load and unload the largest

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cargo steamers in the most rapid and efficient manner possible.

Mr. Cunningham has therefore had unrivalled opportunities of acquiring both a theoretical and practical knowledge of dock construction, and in the volume now under notice he has brought together in a concise and well organised form the results of the knowledge thus acquired. The author has not, however, relied solely on his own experience, but has freely made use of the information contained in the numerous papers on dock matters contributed to the *Proceedings* of the Institution of Civil Engineers and to the numerous reports of the International Navigation Congresses and other technical societies. Of these he has evidently been a diligent reader, as few points of interest in the *Proceedings* of the societies or in the technical journals that have been dealt with during the last few years seem to have escaped his notice.

While the study of this book may be regarded as essential to the younger engineers engaged in dock work, it will be invaluable as a book of reference to the expert engaged in this branch of engineering and its cognate interests.

The book is divided into twelve chapters, dealing in an exhaustive manner with the designing and construction of docks, the materials and plant required, the theory of construction of the walls and gates, the equipment and working of docks when constructed, the appliances required for the handling and transport of cargoes to and from the docks, and for repairing the vessels. The book is well illustrated, there being no less than 34 folding plates and 468 illustrations in the text. The book does great credit both to the author and to the publisher, but, of course, the greatest merit belongs to the former for having furnished the dock engineer with such a valuable aid to his work.

Electric Lighting and Power Distribution. Vol. ii. By W. P. Maycock, M.I.E.E. Pp. xxii+684. (London: Whittaker and Co., 1903.) Price 7*s.* 6*d.*

THIS little book covers a very great deal of ground, so that it is hardly necessary to say that no subject is discussed in any great detail. The opening chapters deal with dynamos, alternating currents and alternators, and these are followed by a chapter on electricity meters, in which most of the leading types are described and illustrated. The next chapter deals with motors; a dozen pages in this chapter are all that are devoted to electric tramways and railways, which will give some idea of the amount of consideration which each branch receives. Other chapters deal with batteries, transformers, and generating stations. The treatment throughout is of a very elementary character, but the descriptions are clear and concise, and the illustrations well selected and very clearly reproduced, so that the book should be of service to the student for the City Guilds and similar technological examinations, for whom it is primarily intended.

Builders' Quantities. By Herbert C. Grubb. Pp. viii+227. (London: Methuen and Co., 1904.) Price 4*s.* 6*d.*

THIS book has been prepared more particularly for the use of candidates studying for the examination in builders' quantities held by the City and Guilds of London Institute. The modes of measurement and examples of "taking off" are given in order for the work of all the trades employed in the erection and completion of a building; and these sections are followed by explanations of squaring dimensions, abstracting, and billing. The text is illustrated by seventy-seven figures.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

The Origin of the Horse.

THE receipt of a copy of Prof. J. C. Ewart's admirable paper on "The Multiple Origin of Horses and Ponies" suggests a few remarks. The paper in question is from the *Transactions* of the Highland and Agricultural Society of Scotland, 1904—one could wish that it had appeared in a publication which comes more regularly under the notice of zoologists. In a previous paper (*Proc.* Roy. Soc. Edinburgh, 1903) Prof. Ewart had shown conclusively that *Equus prjevalskii* was not a hybrid between the kiang and the common horse, and had arrived at the conclusion that it might very well rank as a valid species. Lydekker in 1902 had proposed to regard *E. prjevalskii* (or *przewalskii*) as a subspecies of *E. caballus*, and now Prof. Ewart does the same, while recognising also two other subspecies, *E. c. typicus* and *E. c. celticus.* The animal named *typicus* is the Norse horse, which is arbitrarily selected as the type of the Linnean *caballus.* The Celtic pony, still surviving in the pure state in Iceland, is given the new name *E. c. celticus.* In its way, Prof. Ewart's demonstration of the distinctive characters of this animal deserves to rank with Darwin's treatise on the primrose, as an example of genius applied to common things. The case is so clear that the author himself is evidently half inclined to regard the Celtic pony as a valid species, and it seems to me that the facts justify us in recognising three species of living horses, *E. prjevalskii* (Poliakoff), *E. celticus* (Ewart) and *E. caballus* (L.). The indications are that these animals were quite distinct in the wild state, and the fact that various blends between *caballus* and *celticus* exist in domestication is no more proof of specific identity than the same sort of thing is among the dogs, which nobody doubts to have originated from more than one wild species.

The use Prof. Ewart makes of the prehistoric cave drawings of horses is most suggestive. Possibly these sketches may have been taken a little too seriously in some instances, too little allowance being made for eccentricities in drawing. Fig. 27, from the Kesserloch cave, has a remarkably long body, and one might joyfully recognise the *Equus scotti,* Gidley, were it not that that animal inhabited the plains of Texas and New Mexico.[1] Prof. Ewart accepts the opinion that the living American horses are wholly of Transatlantic origin. While this is probably correct, I was surprised on looking into the matter a few years ago to find that the evidence was not so complete as I had supposed. It is said that the natives showed great surprise at the horses of the Spaniards, being evidently unacquainted with the animals. This was to be expected, for if wild horses lived in America at the time of Columbus, they surely were not in the "tierra caliente," but rather to the

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[1] The New Mexico record is based on a molar tooth found by Miss Ada Springer in the Pleistocene beds of the Arroyo Pecos, Las Vegas, and examined by the writer. It differed in no respect from Gidley's description and figure. Mr. Gidley kindly made for me a number of skull-measurements from the types of *E. scotti*, and I found upon comparisons that the five specimens were much more uniform than a similar series of *E. caballus* picked at random would be. This may be attributed no doubt to the greater uniformity of the wild species, but also to these particular specimens being apparently (from the circumstances of their discovery) members of the same herd. The skulls were 571 to 590 mm. long, and differed from any *caballus* of which I had measurements in (1) the rather longer muzzle, with the upper dental series (molars and premolars) considerably longer, 195 to 204 mm., and (2) apparently in the greater breadth between the orbits above, but Mr. Gidley afterwards wrote that he found that while the breadth between the *anterior* borders of the orbits of *scotti* is slightly greater than in large skulls of *caballus*, the breadth between the *posterior* borders is less; hence it would seem that the eyes of *scotti* looked less forward than those of *caballus*. The other measurements:—zygomatic breadth, greatest breadth of muzzle, least breadth of palate, distance between molars of opposite sides, and the greatest breadth of posterior nares, all fall within the limits of variation of *E. caballus.* Hence it is apparent that *E. scotti* was in many respects similar to *caballus*, as Mr. Gidley indicated in his paper on the subject. The bones other than the skull, taken separately. could not be distinguished from those of *caballus.* Other differences in the skulls than those mentioned have been fully described and illustrated by Mr. Gidley, and the facts need not be repeated. No doubt a more minute study of the osteological characters of fossil horses would throw valuable light on the significance of variations in the living forms.

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